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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/508,322 | 03/09/2000 | JOHN DAVID HOLME | 22815USA | 9705 |

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[REDACTED]
EXAMINER

WILKINS III, HARRY D

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 1742 | 11 |

DATE MAILED: 01/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|----------------------------------|-------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/508,322 | HOLME, JOHN DAVID |
| | Examiner Harry D Wilkins, III | Art Unit 1742 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 November 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4, 7 and 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4, 7 and 8 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-4, 7 and 8 are pending. Claim 1 has been amended and claims 5 and 6 have been cancelled.
2. The rejection under 35 U.S.C. 103 based on the Madsen et al reference has been withdrawn in view of the remarks filed 20 November 2001.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 November 2001 has been entered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al (US 5,948,353) in view of Applicant's admission of prior art and further in view of Madsen (GB 737,510).

Lawrence et al teach a disc brake rotor made of gray cast iron. Lawrence et al teach (see col 1 line 57 to col 2 line 5) that the composition contains 0.5 to 1.0 wt% copper and contains "carbide forming metals" including titanium and vanadium.

Lawrence et al teach a broad range of less than 1 wt% of vanadium, however, it would have been within the expected skill of a routineer in the art to have optimized the content of vanadium to between 0.35 and 0.45 wt%, which is within the specified range of Lawrence et al, in order to maximize hardness and wear resistance. Lawrence et al teach a broad range of less than 1 wt% of titanium.

Applicant admits as prior art (see page 3, second paragraph) that it was well known in the art at the time of the invention that titanium contents below 0.1 wt% promoted graphitization and form hard particles of titanium carbonitride. Also known was that when the titanium content was above 0.05 wt% that cast irons became difficult to machine.

Therefore, it would have been obvious to keep the titanium content of the cast iron of Lawrence et al to a level below 0.05 wt% in order to reduce difficulty in machining because it was well known in the art to do so as admitted as prior art by Applicant. It would have been within the expected skill of a routineer in the art to have optimized the content of titanium in the range of less than 0.05 wt% to create a cast iron with maximum hardness and wear resistance.

Lawrence et al do not teach or suggest that the content of copper should be related to the content of hard carbide forming elements, such as titanium and vanadium.

Madsen teaches (see line 66) that the copper content of a cast iron can be limited by the amount of carbide forming elements, such as vanadium, present in the alloy.

Therefore, it would have been within the expected skill of a routineer in the art to have optimized the ratio of copper to the carbide forming elements, as disclosed by Madsen, in order to optimize the hardness and wear resistance of the cast iron of Lawrence et al.

Regarding claim 2, Lawrence et al teach that the composition also includes chromium at 0.2 to 0.5 wt%.

Regarding claim 3, it would have been within the expected skill of a routineer in the art to have limited the vanadium to an amount less than half the content of copper plus twenty times the content of titanium because once the ratio of copper to carbide forming elements had been established, the content of vanadium would have been above one half of the copper content.

Regarding claim 4, Lawrence et al teach that the composition includes more than 3.40 wt% carbon, 1.0 to 2.5 wt% silicon and less than 0.15 wt% phosphorous which means that the carbon equivalents have a minimum of 3.733 which overlaps the claimed range.

Regarding claim 7, Lawrence et al teach that copper can be included in the range of 0.7 to 0.9 wt%. Therefore, it would have been within the expected skill of a routineer in the art to have optimized the content of copper in order to maximize the hardness and wear resistance.

Regarding claim 8, it would have been within the expected skill of a routineer in the art to have limited the vanadium to an amount less than half the content of copper plus twenty times the content of titanium because once the ratio of copper to carbide forming elements had been established, the content of vanadium would have been above one half of the copper content.

The effective filing date of Lawrence et al is based upon the provisional application which contains all of the specifications relied upon in this rejection.

Response to Arguments

6. Applicant's arguments filed 20 November 2001 have been fully considered but they are not persuasive. The arguments with respect to the rejection based on the Madsen et al reference have been considered and the rejection was withdrawn. Applicant has argued that Lawrence does not provide an enabling disclosure of the use of either titanium or vanadium.

In response to Applicant's argument, the definition of an enabling disclosure is that one skilled in the art would be able to carry out the invention. In the present case, the vanadium and titanium in Lawrence et al are not given a reason for being added. However, it is well known in the art that vanadium and titanium are carbide forming elements, and one of ordinary skill in the art would have reason to adjust the contents of these two elements within the disclosed ranges in order to optimize the function of the carbides. Thus, Lawrence et al in view of Applicant's admission of prior art and further in view of Madsen establishes a *prima facie* case of obviousness. This rejection can be rebutted by a showing of evidence that the present invention produces unexpected

results within the narrow claimed range. Applicant should submit data showing that the claimed invention produces unexpected results within the claimed ranges of vanadium and/or titanium. This can be done by showing that when compared to the closest prior art, which would be the base composition with V and Ti at less than 1 wt% and less than 0.05 wt%, respectively, but outside the presently claimed range, the present invention produces unexpected properties. For example, by using the first illustrative example from the application (page 5), if it were shown that when the cast iron contains about 0.3 and about 0.5 wt% vanadium, the cast iron does not produce the results of the present invention, the *prima facie* case of obviousness would be rebutted. Alternatively, if it were shown that when the cast iron contains about 0.02 and about 0.04 wt% titanium, the cast iron does not produce the results of the present invention, the *prima facie* case of obviousness would be rebutted.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-F 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Art Unit: 1742

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
January 11, 2002

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700